

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : RICOH CO LTD

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### (54) CONFIGURATION METHOD FOR NETWORK CONTROL CIRCUIT

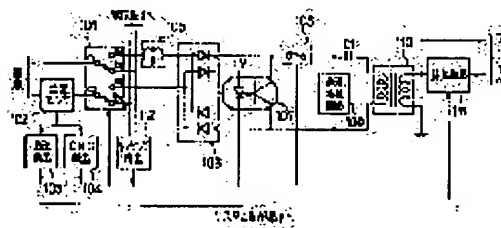
#### (57)Abstract:

**PURPOSE:** To allow the circuit to be in compliance with each country standard simply by providing a means revising an electric specification of the network control circuit through its internal operation and setting the electric specification in compliance with a country in which the circuit is in use automatically.

**CONSTITUTION:** A facsimile equipment reads a country number in a nonvolatile RAM in a memory and reads control data corresponding to the country number from a ROM. The electric specification for a termination circuit 111 and a ringing detection circuit 112 is controlled based on read control data. That is, the circuit 112

applies on/off control to a photocoupler to set a detection condition of a ringing signal. Furthermore, the circuit 111

applies on/off control to a switch according to control data to take impedance matching with a telephone line. Furthermore, a DC loop current flows into a DC resistance circuit 109 and a current sensor, the voltage current characteristic is specified differently by each country and a constant voltage current characteristic to meet the standards of any country is devised.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] It connects with the telephone line of each country, and this invention relates to the configuration approach of a network control circuit of operating by the electric specification based on the specification of each country.

[0002]

[Description of the Prior Art] The network control circuit which detects the various signals received from the exchange in the case of sending and receiving, or sends out a dial signal to the exchange is arranged by various communication devices which communicate through a telephone network, such as facsimile apparatus.

[0003] Usually, since the electric specification of a telephone network is looked like [ the country or firm which lay ] and is determined more, it changes partly with countries. For this reason, the specification of the electric specification required of a network control circuit, i.e., a network control circuit, also changes partly with countries.

[0004] For example, although a network control circuit needs to take impedance matching with the telephone line, the value of standard of the return loss for this impedance matching may change with countries.

[0005] Moreover, a network control circuit detects and carries out the line connection of the ringing signal at the time of arrival of the mail. At this time, direct-current loop current is passed among 2 lines of a circuit.

[0006] In this case, the specification about the value of standard of the signal frequency which should be judged to be a ringing signal, or a signal level, or direct-current loop current may change with countries.

[0007] For this reason, by the communication device manufacturer, when shipping the manufactured communication device to each country, the electric specification in a network control circuit is adjusted so that the specification of a country to ship may be suited.

[0008] Terminal T is arranged in a network control circuit, and he solders the components P, such as resistance of various values, and a capacitor, to that terminal T, and was trying to adjust an electric specification conventionally, as shown in drawing 13 in this case.

[0009] On the other hand, during communication link actuation of a communication device, the metering signal was exchanged among the exchanges of a telephone network, and the telephone rate is managed. The above-mentioned metering signal is a 16kHz signal. If a communication device receives a data signal and such [ together ] a 16kHz signal, trouble will happen to an original communication link. For this reason, such a communication device is usually equipped with the filter circuit which removes the 16kHz component of the input signals.

[0010] Conventionally, such a filter circuit was arranged in the output side of a network control circuit, for example, the case of facsimile apparatus, at the input side of a modem. In this case, that filter circuit was the low pass filter of the complicated circuit of a multistage configuration.

[0011] Moreover, since the above-mentioned direct-current loop current at the time of a line connection

was circuitry passed to the coil of a transformer, it had to make the coil of a transformer thick and had to enlarge the iron core.

[0012]

[Problem(s) to be Solved by the Invention] In order to double the electric specification of a network control circuit with the specification of each country conventionally, different components according to each country had to be attached as mentioned above, and there was a problem of an activity having been troublesome and taking time and effort.

[0013] This invention solves the above-mentioned problem and aims at offering the configuration approach of a network control circuit that an electric specification can be easily doubled with the specification of each country, without applying time and effort.

[0014]

[Means for Solving the Problem] For this reason, he has a means to change the electric specification of a network control circuit by the interior action, and is trying to set automatically in one invention of this application in the electric specification based on the specification of that country by specifying the country which uses it as arbitration.

[0015] Moreover, he passes direct-current loop current and is trying to operate by another invention in the fixed property of being satisfied with coincidence of each specification of two or more countries.

[0016]

[Function] Since it ends only with the activity whose operator specifies the country which uses it according to one above-mentioned invention, an electric specification can be easily doubled with the specification of each country, without applying time and effort. Moreover, according to another invention, about the specification of direct-current loop current, the need also of the activity for doubling specification is lost.

[0017]

[Example] Hereafter, the example of this invention is explained to a detail, referring to an accompanying drawing.

[0018] Drawing 1 shows the block block diagram of the facsimile apparatus concerning one example of this invention. In drawing, the telephone line is connected, and in case the network control circuit 1 is sending and receiving, it detects the various signals received from the exchange, or sends out a dial signal to the exchange. Telephone 2 is used for a message. A modem 3 transmits and receives the procedure signal and drawing information for transmission control in the case of facsimile communication. The facsimile image-processing section 4 reads and carries out the data compression of the drawing information from a manuscript, or returns the received compressed data to the drawing information on original, and carries out a record output at the recording paper.

[0019] The audio response section 5 sends out a fixed voice-told message. While, as for the actuation display 6, an operator performs various actuation, equipment displays operating state etc. Memory 7 is constituted by ROM and nonvolatile RAM and stores a control program and various data. The system control section 8 is microcomputer PYUDA which carries out supervisory control of each part of the above.

[0020] Drawing 2 shows the circuitry of the network control circuit 1. In drawing, one Rhine of the telephone line is connected to the common terminal c\*\*1 of a change-over switch 101, and Rhine of another side is connected to the common terminal c\*\*2 through the current sensor 102. The direct-current detector 103 and the CNG detector 104 are connected to the current sensor 102.

[0021] End connection of the input of a rectifier circuit 106 is made through LC filter 105, and direct continuation of the contact a\*\*2 is carried out for the contact a\*\*1 of a change-over switch 101 to the other end. LC filter 105 is the resonance circuit of a coil and 1 set of capacitor, and resonance frequency is set as 16kHz. As for a rectifier circuit 106, bridge connection of the four diodes is carried out.

[0022] + side of the output of a rectifier circuit 106 is connected to the collector of the transistor of a photo coupler 107, and one contact of a switch 108, and the - side is connected to the emitter of the transistor of a photo coupler 107, the end of the direct-current-resistance circuit 109, and the end of one coil of a transformer 110, respectively. The other end of a switch 108 is connected to the other end of the

above-mentioned coil through the capacitor C1 while connecting with the other end of the direct-current-resistance circuit 109.

[0023] The end of the coil of another side of a transformer 110 is grounded, and is connected to the other end at the termination circuit 111. In addition, an input signal is inputted into a modem 3 from the other end of the above-mentioned coil, and the sending signal of a modem 3 is inputted into a termination circuit 111.

[0024] The contact b\*\*1 of a change-over switch 101 and b\*\*2 are connected to the ringing detector 112 and telephone 2, respectively.

[0025] Fixed electrical-potential-difference +V is impressed to the anode of the photodiode in a photo coupler 107, and the cathode is connected to the system control section 8. Moreover, the detection signal of the direct-current detector 103, the CNG detector 104, and the ringing detector 112 is inputted into the system control section 8, respectively, and the control signal is inputted into the change-over switch 101, the switch 108, and the ringing detector 112 from the system control section 8.

[0026] Drawing 3 shows the circuitry of the ringing detector 112. In drawing, Rhine of the contact b\*\*1 of a change-over switch 101 is connected to the end of resistance R2, and the end of the input of a rectifier circuit 1122 through a switch 1121, a capacitor C2, and resistance R1. Moreover, Rhine of the contact b\*\*2 of a change-over switch 101 is connected to each other end of direct current resistance R2 and a rectifier circuit 1122.

[0027] + side of the output of a rectifier circuit 1122 is connected to each end of resistance R2-R4, and the cathode of the CHIENA diode D1, respectively. The other end of resistance R3 is connected to the collector of the transistor of a photo coupler 1123. The other end of resistance R4 is connected to the collector of the transistor of a photo coupler 1124. The anode of the CHIENA diode D1 is connected to the anode of the photodiode of a photo coupler 1125. And - side of the output of a rectifier circuit 1122 is connected to the cathode of each emitter of the transistor of photo couplers 1123 and 1124, and the photodiode of a photo coupler 1125, respectively.

[0028] Fixed electrical-potential-difference +V is impressed to the collector of the transistor of a photo coupler 1125, and the emitter is grounded to it. The signal level of the collector is inputted into the system control section 8. Moreover, fixed electrical-potential-difference +V is impressed to the anode of the photodiode of photo couplers 1123 and 1124, and those cathodes are connected to the system control section 8. Moreover, the control signal is inputted into the switch 1121 from the system control section 8.

[0029] Drawing 4 shows the circuitry of a termination circuit 111. In drawing, the end of resistance R5 and R6 and a capacitor C3 is connected to Rhine of the coil of a transformer 110, respectively. And the other end of resistance R5 is connected to the output of a modem 3 through the switch 1111. Similarly, the other end of a switch 1112 and a capacitor C3 is connected to the output of the above-mentioned modem 3 for the other end of resistance R6 through the switch 1113, respectively. The control signal is inputted into switches 1111-1113 from the system control section 8.

[0030] The direct-current-resistance circuit 109 is constituted using resistance, a capacitor, diode, and a transistor, although circuitry is not illustrated. This direct-current-resistance circuit 109 is a circuit which passes regular direct-current loop current in a circuit in the time of the line connection of the network control circuit 1, i.e., an off-hook condition.

[0031] With the above configuration, the network control circuit 1 of the facsimile apparatus of this example has the function based on the electric specification of two or more countries.

[0032] If it shall have the function based on the electric specification of now, for example, three countries, as shown in drawing 5, the country code and control data to the three countries, A countries - C country are beforehand stored in ROM of memory 7. This control data is for changing the electric specification of the network control circuit 1.

[0033] In case the facsimile apparatus of this example is manufactured at works and shipped towards each country, it sets up a country code. In this case, as shown in drawing 6, an operator sets up the country code which shows the destination of equipment by predetermined actuation (processing T101). Facsimile apparatus memorizes the inputted country code by the nonvolatile RAM in memory 7

(processing T102).

[0034] Next, this facsimile apparatus is installed in the country of a destination, and suppose that the equipment power source was turned on. In this case, as shown in drawing 7, facsimile apparatus reads the country code of the nonvolatile RAM in memory 7 (processing T201), and reads the control data applicable to that country code from ROM further (processing T202).

[0035] And the electric specification of \*\*\*\*\*, a termination circuit 111, and the ringing detector 112 is controlled to the read control data. That is, photo couplers 1123 and 1124 are controlled by the ringing detector 112 in the fixed on-off condition according to control data. This is control which sets up the detection conditions of a ringing signal. Moreover, switches 1111-1113 are controlled by the termination circuit 111 in the fixed on-off condition according to control data. This is control which takes impedance matching with the telephone line (processing T203).

[0036] Next, when performing dispatch processing with this facsimile apparatus, as shown in drawing 8, an operator sets up the destination and starts dispatch actuation (processing T301). If facsimile apparatus is started, it will make change-over connection of the change-over switch 101 at Contact a side (processing T302). And a switch 108 is closed (processing T303).

[0037] In this case, a change-over switch 101, LC filter 105, a rectifier circuit 106, a switch 108, the direct-current-resistance circuit 109, and the direct current circuit by the current sensor 102 are formed, and direct-current loop current flows.

[0038] The voltage-current property in this case is prescribed by the specification of each country. Here, the specification Sb of B countries and this drawing (c) shall show [ the specification Sa of A countries that drawing 9 (a) is based by this example, and this drawing (b) ] the specification Sc of C country now, respectively. In addition, in these drawings, an axis of abscissa shows direct-current loop current, and, as for the direct current voltage between circuit 2 lines, and a hatching field, the axis of ordinate shows the specification range, respectively.

[0039] In this example, as shown in drawing 1010, both the direct-current-resistance circuits 109 are designed so that the fixed voltage-current property F of satisfying each specification Sa-Sc of the three above-mentioned countries may be shown. Thereby, when facsimile apparatus is installed in every three above-mentioned countries country, it comes to be based on the specification of the voltage-current property of the country.

[0040] After this, facsimile apparatus once opens a switch 108 and carries out on-off control of the photo coupler 107 according to a phase hand number. Thereby, a dial pulse is sent out to a circuit and it sends to a phase hand (processing T304). In addition, a switch 108 will be again closed, if sending out of a dial pulse is completed.

[0041] And a response of a phase hand performs communication link actuation of predetermined facsimile.

[0042] In this case, an input signal is inputted into the both ends of the direct-current-resistance circuit 109 in the same circuit as the above-mentioned direct-current loop formation, and is further inputted into a modem 3 through a capacitor C1 and a transformer 110.

[0043] Moreover, the sending signal of a modem 3 is inputted into a termination circuit 111. It changes the on-off control of the switches 1111-1113 of a termination circuit 111 into the fixed condition with the control data. In this example, both [ one side or ] R5 and R6 is inserted in this circuit by this control. Moreover, a capacitor C3 is inserted in this circuit if needed. Therefore, the inputted sending signal is inputted into a transformer 110 through resistance R5 and R6 and a capacitor C3, and is sent out to a circuit in a path opposite to the above-mentioned circuit. Thus, facsimile communication is performed.

[0044] By the way, a termination circuit 111 carries out the operation which takes the impedance matching between the telephone line and a modem 3. As for this impedance matching, return loss is prescribed like 14dB or more to the impedance 600ohm [ for example, ] circuit by specification. As mentioned above, resistance R5 and R6 and a capacitor C3 are inserted in a circuit if needed, and he adjusts an impedance, and is trying to be satisfied with this example of the specification of the return loss of each country.

[0045] The metering signal currently exchanged among the exchanges of a telephone network during such a communication link on the other hand may be received. This metering signal is a 16kHz signal. LC filter 105 is LC resonance circuit which aligned with the 16kHz. Thereby, a metering signal is removed and a modem 3 receives.

[0046] Next, arrival-of-the-mail actuation of this facsimile apparatus is explained.

[0047] At the time of standby of facsimile apparatus, change-over connection was made at the b side, and the change-over switch 101 has closed the switch 1121 of the ringing detector 112.

[0048] Now, supposing it receives a message, the ringing signal received from the telephone line will be inputted into the ringing detector 112. Since a ringing signal is an alternating current, it passes along a switch 1121, a capacitor C2, and resistance R1 in this case, and they carry out splitting to resistance R2 and a rectifier circuit 1122. The current which flowed into the rectifier circuit 1122 is rectified here.

[0049] Photo couplers 1123 and 1124 are controlled by the control data by the fixed on-off condition, as mentioned above. When a photo coupler 1123 is ON, resistance R3 is connected to the output of a rectifier circuit 1122. Similarly, when a photo coupler 1124 is ON, resistance R4 is connected. The output current of a rectifier circuit 1122 flows to those resistance, and the CHIENA diode D1 and the diode of a photo coupler 1125, when resistance R3 and R4 is connected.

[0050] When a both-ends electrical potential difference becomes more than a fixed electrical potential difference, as for the CHIENA diode D1, a current flows. Moreover, the photodiode of a photo coupler 1125 is also turned on when the both-ends electrical potential difference becomes more than a fixed electrical potential difference.

[0051] Therefore, when the input voltage to this ringing detector 112 becomes beyond a certain fixed electrical-potential-difference value, that of a photo coupler 1125 will light up [ a photodiode ]. In this case, that fixed electrical potential difference will become higher if resistance R3 and R4 are connected.

[0052] By the way, in the case of beyond 18V, in the case of not more than "detection" 10V, the specification of the detection conditions of a ringing signal is prescribed by signal frequency and the electrical-potential-difference value like "un-detecting" in 40-60Hz.

[0053] He switches the connection condition of resistance R3 and R4, and is trying to make the detection conditions of a ringing signal based on the specification of each country with said control data in this example.

[0054] Thereby, if a regular ringing signal is received, a photo coupler 1125 will turn on and the system control section 8 will come to detect arrival of the mail.

[0055] At the time of standby, facsimile apparatus is always supervising arrival of the mail, as shown in drawing 11 (loop formation of N of processing T401). And detection of arrival of the mail makes change-over connection of the change-over switch 101 at the a side (processing T402). (Y of processing T401)

[0056] And reception of a CNG signal is supervised (processing T403). Origination-side facsimile apparatus is the 1100Hz tone signal sent out first, and a CNG signal is detected in a current sensor 102 and the CNG detector 104. Detection of this CNG signal performs communication link actuation of predetermined facsimile like the time of said dispatch (Y of processing T403).

[0057] On the other hand, a CNG signal is not received when phase hands are those who are sending from telephone. In this case, (N of processing T403), for example, the voice-told message of "connecting with facsimile apparatus now", is sent out (processing T404), and actuation is ended. Although this voice-told message is outputted from the audio response section 5 and illustrated, it is inputted into the ringing detector 112. Thereby, it is transmitted like the sending signal of said modem 3.

[0058] Next, an operator does off-hook [ of the telephone 2 ], when sending by telephone 2.

[0059] The facsimile apparatus of this example is supervising OFUFUKKU of telephone 2, as shown in waiting and drawing 12 (processing T501). That is, since the change-over switch 101 has switched to the b side at the time of standby, telephone 2 is caused off-hook and direct-current loop current flows in a circuit. A current sensor 102 and the direct-current detector 103 detect the direct-current loop current. The hook condition of telephone 2 is judged according to this direct-current loop current.

[0060] When off-hook [ of the telephone 2 ] is carried out (Y of processing T501), the switch 1121 of the ringing detector 112 is opened (processing 502), and when on hook [ of the telephone 2 ] is carried out (it is Y of processing T503 from N of processing T501), he is trying to close a switch 1121 in this example (processing T504).

[0061] An operator does dial actuation, after doing off-hook [ of the telephone 2 ]. Thereby, a dial pulse is outputted from telephone 2 and it is sent out to a circuit. And a message will become possible if a phase hand answers.

[0062] As mentioned above, if it has a means to change the electric specification of the detection conditions of return loss or a ringing signal over an input signal, in the network control circuit 1 and an operator inputs a country code, he is trying to set automatically in this example in the electric specification based on specification in the corresponding country. Moreover, the direct-current-resistance circuit 109 is set as the fixed voltage-current property of being satisfied with coincidence of each specification of two or more countries.

[0063] The troublesome activity of attaching different components according to the country which uses it like before by this is unnecessary, and an electric specification can be easily doubled with the specification of each country, without applying time and effort.

[0064] Moreover, since the 16kHz input signal was prevented by LC filter 105 which is the resonance circuit of a coil and 1 set of capacitor, circuitry becomes easy.

[0065] Moreover, since direct-current loop current is passed as it is required in the direct-current-resistance circuit 109, and it was made not to pass it to a transformer 110, it can constitute a transformer 110 small.

[0066] Moreover, when off-hook [ of the telephone 2 ] is carried out, he is trying to open a switch 1121. When the dial pulse outputted from telephone 2 flows into a capacitor C2, pulse shape becomes blunt and there is a possibility that the exchange may cause the reading error of a dial signal. In this example, since a switch 1121 is opened in case an operator does dial actuation, a dial pulse does not flow into a capacitor C2, and the reading error of the above-mentioned dial signal is prevented.

[0067] In addition, although it was made to set automatically the detection conditions of a ringing signal, and the specification of a termination circuit by inputting a country code in the above example, setting other electric specifications automatically similarly is also considered.

[0068] Moreover, although explained taking the case of facsimile apparatus, it cannot be overemphasized that this invention is similarly applicable in the various communication devices which have a network control circuit.

[0069]

[Effect of the Invention] Above, like, according to one invention of this application, it has a means to change the electric specification of a network control circuit, and only by specifying the country which uses it, since it was made to be based on the specification of the country, an operator can double an electric specification with the specification of each country easily, without applying time and effort.

[0070] Moreover, in another invention, since direct-current loop current was passed in the fixed property of being satisfied with coincidence of each specification of two or more countries, about the specification of direct-current loop current, the need also of the activity for doubling specification is lost.

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[Translation done.]



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CLAIMS

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[Claim(s)]

[Claim 1] The configuration approach of the network control circuit characterized by setting automatically in the electric specification based on the specification of the country by connecting with the telephone line of each country, having a means to change the electric specification of a network control circuit by the interior action in the configuration approach of a network control circuit of operating by the electric specification based on the specification of each country, and specifying the country which uses it as arbitration.

[Claim 2] The above-mentioned specification is the configuration approach of the network control circuit according to claim 1 characterized by being the detection conditions of the ringing signal received from the telephone line.

[Claim 3] The above-mentioned specification is the configuration approach of the network control circuit according to claim 1 characterized by being the return loss to the input signal which receives from the telephone line.

[Claim 4] The configuration approach of the network control circuit characterized by having a means to pass direct-current loop current and to operate in the fixed property that it is satisfied with the property which was connected to the telephone line of each country and based on the specification of each country at the telephone line of each specification of two or more countries at coincidence in the configuration approach of a network control circuit of passing direct-current loop current and operating.

[Claim 5] It is the configuration approach of the network control circuit characterized by preventing the above-mentioned input signal by 1 set of resonance circuits of a coil and a capacitor in the configuration approach of a network control circuit equipped with a means to prevent the 16kHz input signal which receives from the telephone line.

[Claim 6] The configuration approach of the network control circuit characterized by passing the above-mentioned direct-current loop current through circuits other than the coil of a transformer in a network control circuit in the configuration approach of a network control circuit of connecting with the telephone line, passing direct-current loop current in the circuit, and operating in it.

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[Translation done.]

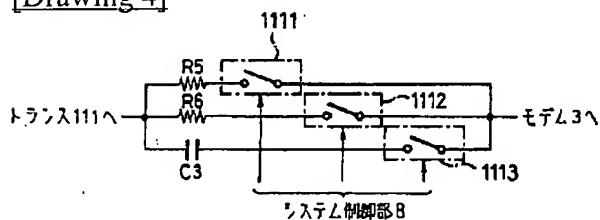
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## DRAWINGS

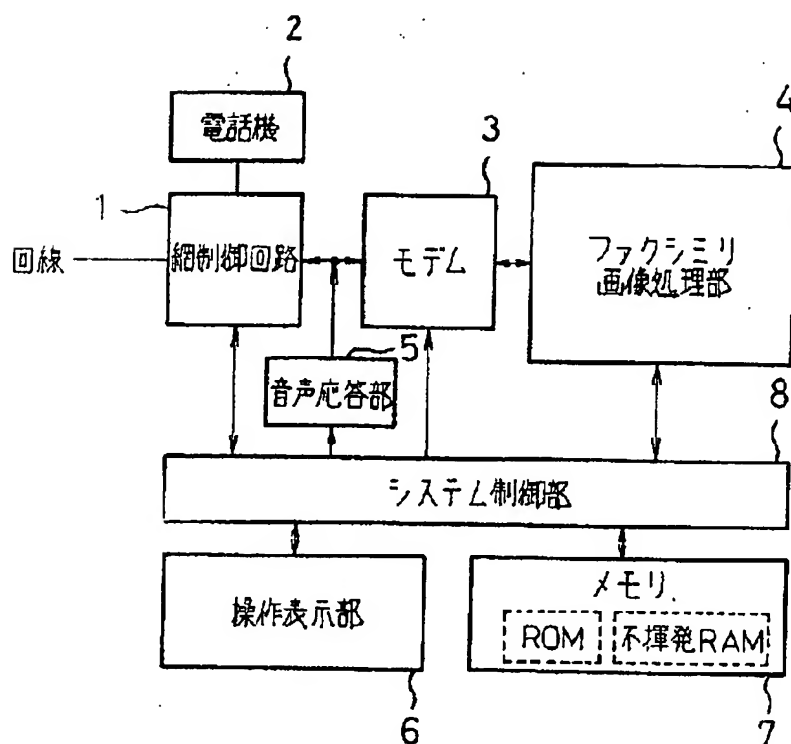
[Drawing 4]



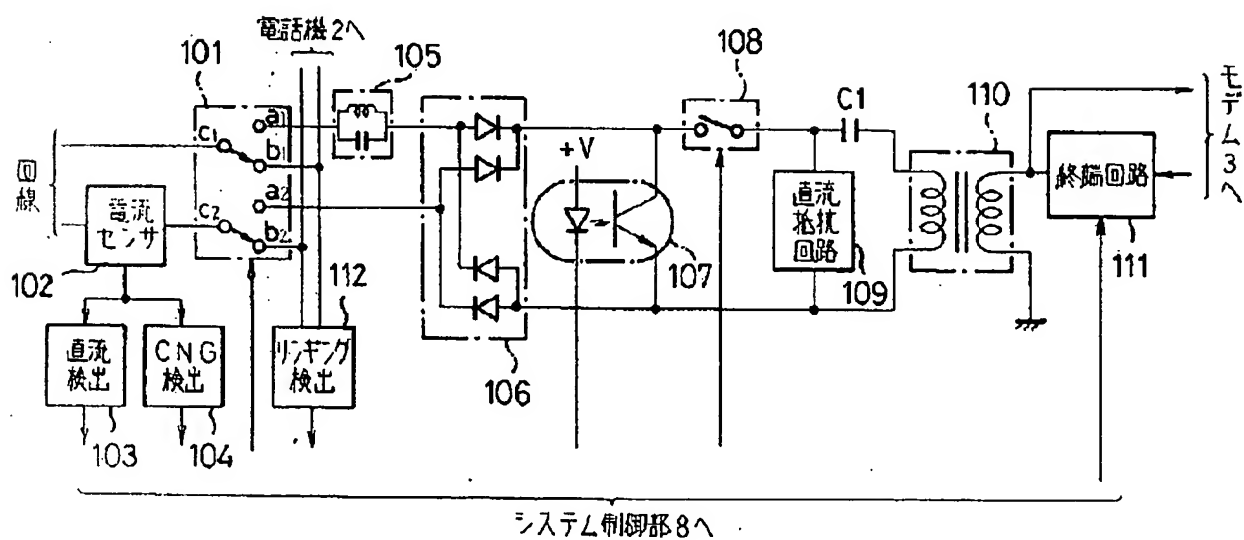
[Drawing 5]

国番号	制御データ	
X X	1011 .....	(A国用)
X X	1100 .....	(B国用)
X X	0101 .....	(C国用)

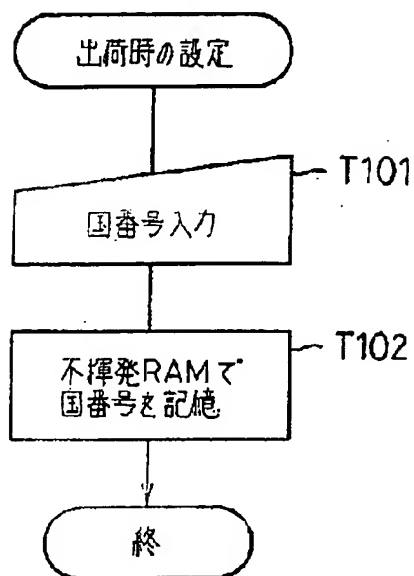
[Drawing 1]



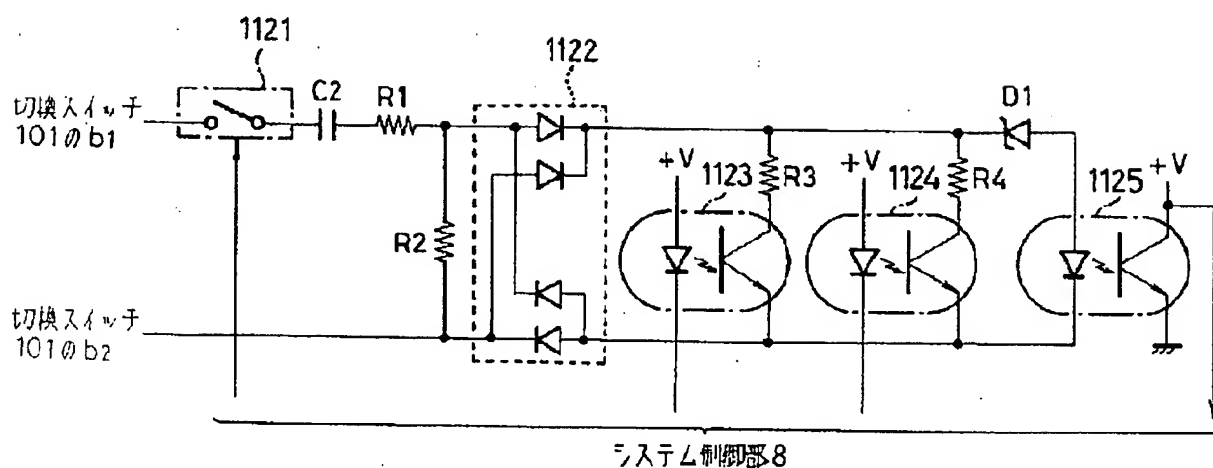
[Drawing 2]



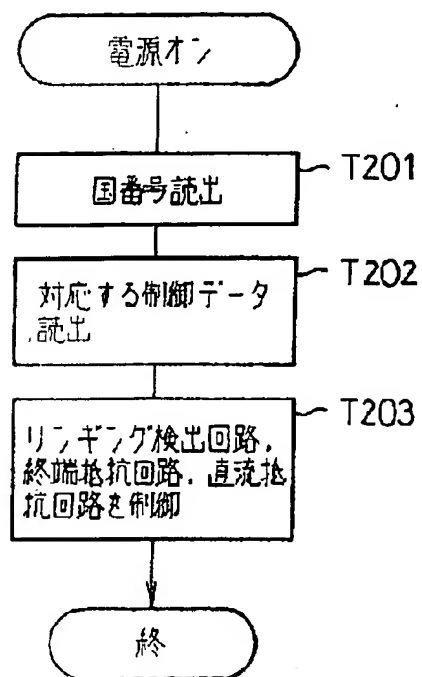
[Drawing 6]



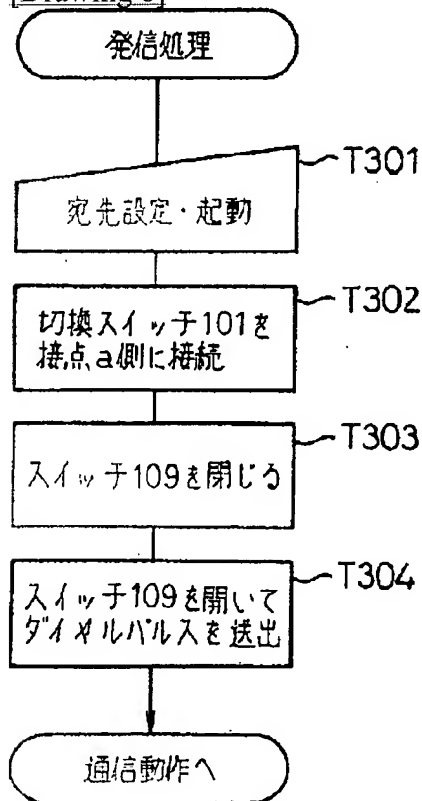
[Drawing 3]



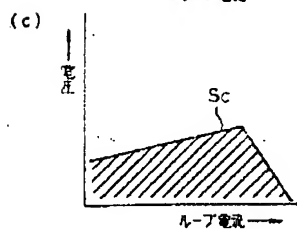
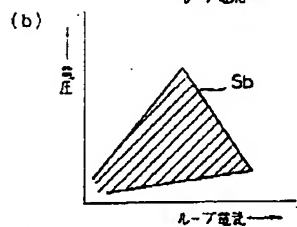
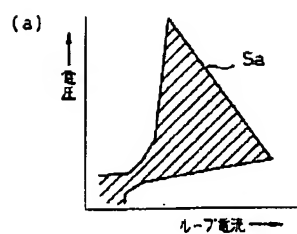
[Drawing 7]



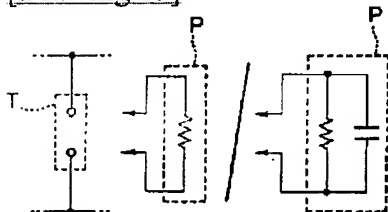
[Drawing 8]



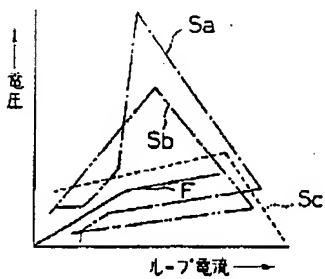
[Drawing 9]



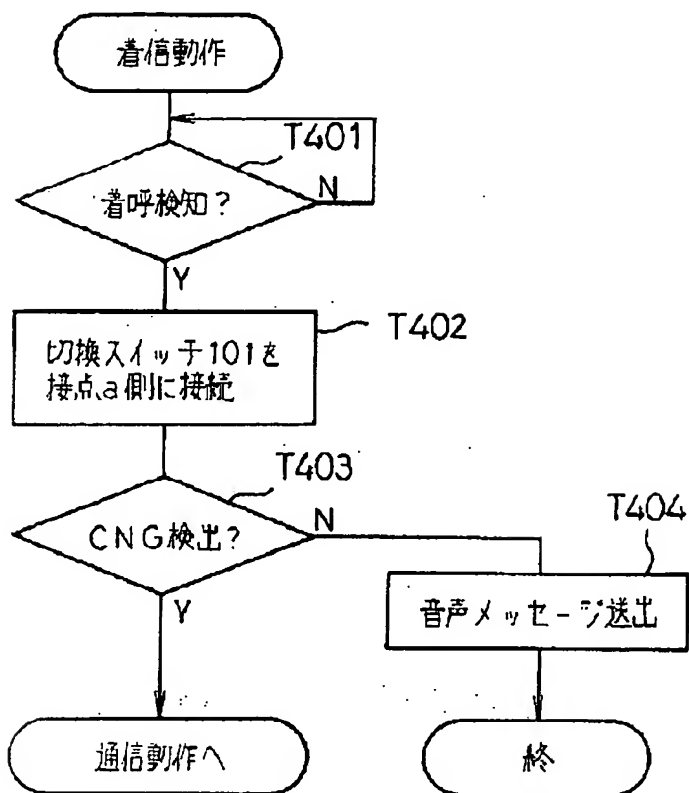
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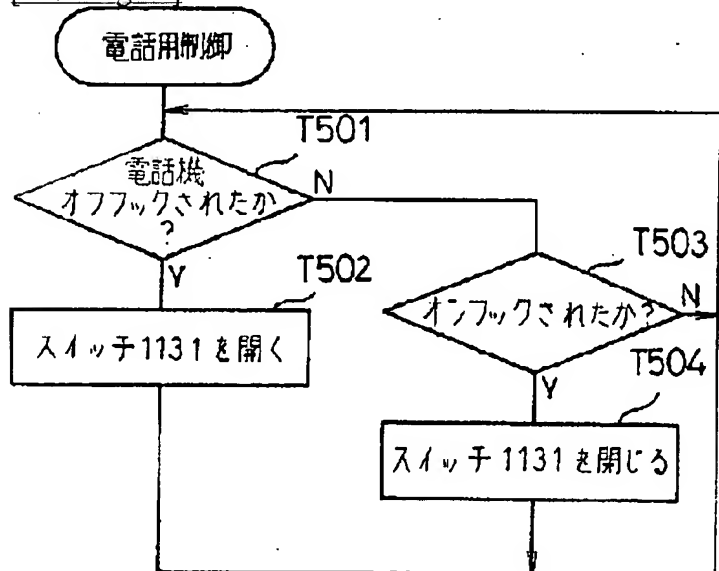
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]